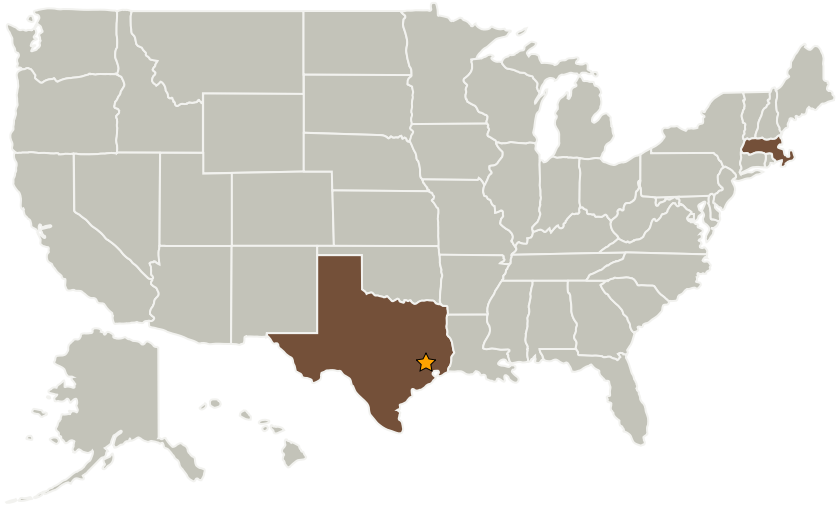
High-Pressure Oxygen Concentrator, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

NASA desires to generate and store gases including oxygen and nitrogen at sub-critical conditions as a part of its lunar and spacecraft atmospheric systems. Oxygen at pressures up to 3000 psia is particularly desired for refilling storage tanks for lunar and in-flight applications including recharging high-pressure gas bottles for EVA/EMU, lunar rovers and surface hoppers, and lunar chemical process reactors requiring oxygen as a reactant. To address these needs, Reactive Innovations, LLC proposes to develop a compact high-pressure oxygen concentrator that can take low-pressure atmospheric gas and generate a separate stream of high-pressure pure oxygen. During the Phase I program, we will modify and adapt our high-pressure reactor hardware to compress and separate an oxygen stream up to 3000 psia from an ambient air source containing nitrogen and oxygen. A predictive performance model will be developed for the oxygen concentrator allowing NASA mission planners to conduct trade studies on metrics including the generated oxygen rate per compressor mass and power requirements. By the end of the Phase I effort, this concentrator will be at a Technology Readiness Level of 3 with a Phase II program delivering a 3000 psia operational oxygen generator and compressor at a TRL of 4-5.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Reactive Innovations, LLC	Supporting Organization	Industry	Westford, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Michael C Kimble

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.3 Resource Processing for Production of Mission Consumables